UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/527,061 | 03/09/2005 | Oliver May | 266811US0XPCT | 4748 |

22850 7590 12/19/2008

OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

| EXAMINER | |
|---|---|
| MEAH, MOHAMMAD Y | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1652 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 12/19/2008 | ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

**DETAILED ACTION**

The claims 25, 27-32, 34, 39-44 pending in the instant office action.

***Claim Rejections***

Applicants' arguments filed on 11/21/08, have been fully considered, but they are found unpersuasive to overcome the rejections previously applied.

Therefore, claims 25, 27-32, 34, 39-44 remain rejected for the reasons of record.

***CLAIM Rejection - 35 U.S.C 103a***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 25, 27-32, 34, 39-44 are rejected under 35 U.S.C. 103(a) by Fotheringham et al. ( US PAT 5728555) in view of Grifantini et al. (US 5877003) and Marceau (JBC 1988, PP 16916-16933)

Fotheringham et al. teaches *E coli* strain having mutated *dadA* gene (claim 5-6) wherein said strain does not show D-amino acid oxidase activity. They also used the said strain for the production of D-amino acids such as D-phenyl alanine, D-serine, D-methionine, D-tryptophan, etc ( table 1).

Grifantini et al. (US 5877003) teach recombinant microorganisms (column 5), such as *E. coli,* expressing D-hydantoin racemase and mutant D- carbamoylase genes

from *Agrobacterium* and methods of production D-amino acids using said recombinant microorganism (claim 20).

Marceau et al. (JBC 1988, PP 16916-16933) teach the isolation of D-serine dehydratase (*DSDA*) from *E. Coli* and found that inactivating DSD in *E. coli* by mutating amino acid residues of DSD polypeptide decrease the degradation of D-amino acids ( such as D serine, D-threonine, etc).

One of ordinary skill in the art is motivated to transform the *E. coli* strain of Fotheringham et al. with D-hydantoin racemase and mutant D- carbamoylase genes from *Agrobacterium* ( as taught by Grifantini et al.) ( for claims 25, 27-32) and further mutate said *E. coli* strain's *dsdA* gene ( for claims 34, 39-44) in order to increase D-amino acid production by decreasing its degradation.

As such it would have been obvious to one of ordinary skill in the art to mutate *dadA* gene (taught by Fotheringham et al) , delete or mutate the *dsdA* gene ( for claims 34, 39-44) of an *E. coli* (as suggested by Marceau et al) and express said mutant strain with D-hydantoin racemase and mutant D- carbamoylase genes ( as taught by Grifantini et al.) so that said mutant *E. coli* strain increases the production of D-amino acid compare to wild type *E. coli* strain.

Regarding claim 31 though Fotheringham et al. do not teach making D-aminobutyric acid using *E coli strain* having mutated *dadA* gene ( claim 5-6) wherein said strain does not show D-amino acid oxidase activity. In light of production of D-amino acids, like, D-phenyl alanine, D-serine, D-methionine, D-tryptophan, etc ( table

1) by the said *E coli* strain, one of ordinary skill in the art is motivated to use Fotheringham et al said *E coli* strain to make D-aminobutyric acid.

As such it would have been obvious to one of ordinary skill in the art to use the *E. coli* taught by Grifantini et al. and modify the microorganism by deleting *dadA gene* as taught *by* Fotheringham and mutating the *dsdA* gene as suggested by Marceau et al. to increase the production of D-aminobutyric acid.

Applicants' arguments against the USC 103(a) rejection for claims 25, 27-32, 34, 39-44 are fully considered, but they are found unpersuasive. Applicants argue that their invention (claim 25) comprise *E. coli* strain, having mutated *dadA* gene, is expressed with D-hydantoin racemase and mutant D-carbamoylase genes and combining prior arts, Fotheringham et al. and Grifantini et al. would not be ovbious for rejection of their invention. Fotheringham et al. teaches *E. coli* strain having mutated *dadA* gene shows improve production of amino acid and Grifantini et al. teach recombinant micro-organisms (column 5), such as *E. coli,* expressing D-hydantoin racemase and mutant D- carbamoylase genes for the production of D-amino acid. One of ordinary skill in the art would have easily envisioned to combine the teaching Fotheringham et al. and Grifantini et al. to make transformed *E. coli* for improved production of D-amino acid. Applicant further argue that Grifantini et al. teach recombinant microorganisms such as *E. coli,* expressing D-hydantoin racemase and mutant D- carbamoylase genes for the production of D-amino acid but does not teach said *E. coli* having muted *dadA* gene. If Grifantini et al. teach use of *E. coli* having muted dadaA gene, Grifantini et al. would anticipate applicants invention and would be an 102 art. However, since Fotheringham

et al. teaches *E. coli* strain having mutated *dada* gene shows improve production of amino acid and Grifantini et al. teach recombinant microorganisms such as *E. coli,* expressing D-hydantoin racemase and mutant D- carbamoylase genes for the production of D-amino acid, it is obvious to combine these two prior art. Applicants argument that Marceau et al. is non-analogous art is not true, because Marceau et al. is used in combination with Fotheringham et al. and Grifantini et al. for rejection of claim34, 39-44. Since inactivating DSD in *E. coli* by mutating amino acid residues of DSD polypeptide increase the production of D-amino acids. It is obvious to combine the teaching of Marceau et al. with Fotheringham et al. and Grifantini et al.

**Conclusion**

Claims 25, 27-32, 34, 39-44 remain rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohammad Meah whose telephone number is 571-272-1261. The examiner can normally be reached on 8:30-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nashaat T. Nashed can be reached on 571-272-0934. The fax phone number for the organization where this application or proceeding is assigned is 571-272-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mohammad Younus Meah
Examiner, Art Unit 1652
Recombinant Enzymes, 3C31 Remsen Bld.
400 Dulany Street, Alexandria, VA 22314
Telephone: 517-272-1261

/Nashaat T. Nashed/
Supervisory Patent Examiner, Art Unit 1652